

Scoping Heritage Impact Assessment of a proposed Wind Energy  
Facility to be situated within Caledon district, South Western Cape  
Province.

Prepared for  
Arcus Gibb (Pty) Ltd  
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*First Draft*



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## **Executive summary**

ACO Associates cc was appointed by Arcus Gibb (Pty) Ltd of behalf of the proponent (Caledon Wind) to conduct a scoping level heritage assessment for the proposed Caledon Wind Farm, Western Cape Province of South Africa. The proponents propose to construct a wind energy facility of up to 150 turbines along with power lines and access roads on the 1400 hectare area to be constructed over 6 phases.

Heritage indicators identified during this scoping study are

- Although no previous work has been completed in or close to the study area, pre-colonial archaeology from the Holocene and Pleistocene is likely to exist in the area and may be impacted by the proposed activity. Depending on the outcome of a heritage survey of the study area, mitigation is likely to be feasible.
- Historical sites and buildings are likely to be sparse within the study area, however preliminary historical research has indicated that the farms involved were granted in the early 18th century to Dutch speaking farmers. This indicates that there is a possibility that farm buildings exist in the study area which are greater than 60 years of age and are therefore protected by the National Heritage Resources Act. A solid archival study is needed to determine the historical significance of farms in the area and within a radius of 2km from the site. This issue will need to be checked during the site inspection and addressed in the EIA.
- Probable impacts to cultural landscape are a serious concern as the study area lies within a heritage rich region and close to scenic routes. This issue will need to be followed up with detailed investigation along with completion of a Visual Impact Assessment. Impacts of high significance are anticipated.
- The area is situated on the Bokkeveld group and is potentially fossiliferous. An independent desktop palaeontological assessment will be required as part of the EIA.

### **Declaration:**

Mr Tim Hart and Dr Lita Webley are independent specialist consultants who are in no way connected with the proponent, other than delivery of consulting services.

Tim Hart (MA) is an archaeologist with 22 years of working experience in heritage throughout southern Africa. He is accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

Lita Webley (Phd) is an archaeologist with 30 years of working experience. Having served previously as Director of the Albany Museum, she is familiar with the history of the area and local heritage issues. She is also accredited with Principal Investigator status with the Association of Professional Archaeologists of Southern Africa.

## GLOSSARY

**Archaeology:** *Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.*

**Early Stone Age:** *The archaeology of the Stone Age between 700 000 and 2500 000 years ago.*

**Fossil:** *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

**Heritage:** *That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.*

**Holocene:** *The most recent geological time period which commenced 10 000 years ago.*

**Late Stone Age:** *The archaeology of the last 20 000 years associated with fully modern people.*

**Middle Stone Age:** *The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.*

**National Estate:** *The collective heritage assets of the Nation*

**Palaeontology:** *Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.*

**Pleistocene:** *A geological time period (of 3 million – 20 000 years ago).*

**SAHRA:** *South African Heritage Resources Agency – the compliance authority which protects national heritage.*

**Structure (historic:)** *Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.*

**Wreck (protected):** *A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.*

## Acronyms

DEAT	Department of Environmental Affairs and Tourism
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

## CONTENTS

<b>INTRODUCTION .....</b>	<b>6</b>
1.1 The need for the project .....	6
1.1.1 The proposal .....	6
1.2 The receiving environment .....	8
<b>2. Methodology for study .....</b>	<b>8</b>
2.1 Restrictions and assumptions .....	9
2.2 Legislative context .....	9
<b>3. FINDINGS.....</b>	<b>10</b>
3.1 Palaeontology .....	10
3.1.1 Nature of Impacts .....	10
3.1.2 Extent of Impacts .....	10
3.2 Pre-colonial archaeology .....	10
3.2.1 Nature of impacts .....	10
3.2.2 Extent of impacts .....	11
3.3 Colonial period heritage .....	11
3.3.1 Nature of impacts .....	11
3.3.2 Extent of Impacts .....	11
3.4 Cultural landscape and sense of place .....	11
3.4.1 Nature of impacts .....	12
3.4.2 Extent of impacts .....	12
<b>4. Future work in the EIA phase .....</b>	<b>12</b>
4.1 Paleontological material .....	12
4.2 Archaeological heritage .....	12
4.3 Un-identified archaeological material, fossils and fossil bone .....	12
4.4 Built Environment .....	13
4.5 Cultural landscape and sense of place .....	13
<b>5. CONCLUSION.....</b>	<b>13</b>
5.1 Further work .....	13
<b>6. REFERENCES .....</b>	<b>14</b>

## INTRODUCTION

ACO (Archaeology Contracts Office) was appointed by Arcus Gibb (Pty) Ltd to conduct a scoping level heritage impact assessment of portions of 24 farms between Botrivier and Caledon, Overberg Area, South Western Cape, South Africa (Figure 1). The proponent proposes to construct a wind energy facility of up to 150 turbines along with supporting infrastructure. This proposal has triggered a full EIA process, this report being the heritage component of the scoping study. At this early stage in the project the layout of the proposed facility has not been finalized. The proponent is currently conducting wind monitoring studies on site (already authorized) to inform the future specifications of the facility.

### 1.1 The need for the project

South Africa is currently experiencing an energy crisis with the national electricity provider (Eskom) being unable to produce enough power to serve the nation's peak demand. Rural areas are presently subject to frequent load shedding. In addition global warming caused by emissions of greenhouse gas has meant that the pressure is on globally to utilize clean and renewable energy resources. The government is currently making it possible for private energy producers to sell electricity to the national energy provider (Eskom Holdings). Wind turbines represent a viable clean energy source that can be implemented with minimal disruption to agricultural activity.

#### 1.1.1 The proposal

According to the background information supplied by Arcus Gibb, the turbines are proposed to be positioned over an area of approximately 1500 hectares. The proponent, after feasibility studies have identified this site as being suitable as it is situated on a local elevated ridge within the rolling wheat lands of the Overberg.

Infrastructure associated with the wind energy facility will include:

- The full phased project will be a 300MW Wind Energy Facility. The 150 Wind Turbines to be installed in 6 phases (25 Turbines per phase)
- The study area is 1400 hectares zoned agricultural. No rezoning is intended as the land will continue to be used for agricultural purposes.
- Turbines typically require concrete foundations of about 30x30x3 m set in the ground surface to support the turbine towers
- Underground cables between turbines
- Overhead power line (132 kV distribution lines) feeding into the Eskom electricity distribution network.
- Access roads to the site from the main roads (R43) within the area
- Internal access roads to each wind turbine, and the substations.
- During the construction period, corridors of landscape disturbance will occur as lay-down areas will need to be prepared, heavy lift cranes and abnormal load trucks brought on to the site.

While specifications have yet to be determined, each turbine typically consists of a concrete foundation on to which a steel column is bolted. Each column will be 80 m high. On top of each column is the nacelle which contains the generator and gear box. The generator is powered by the wind driven rotor, the blades of which can be up to 45m in length. Turbines will be optimally positioned to make the most of ambient wind conditions, but generally spaced several hundred

meters apart. At present studies are ongoing to determine the optimal locations for wind turbines. Since wind turbines utilize such a small portion of the land surface, once the facility is established normal agricultural activity can take place on the land.

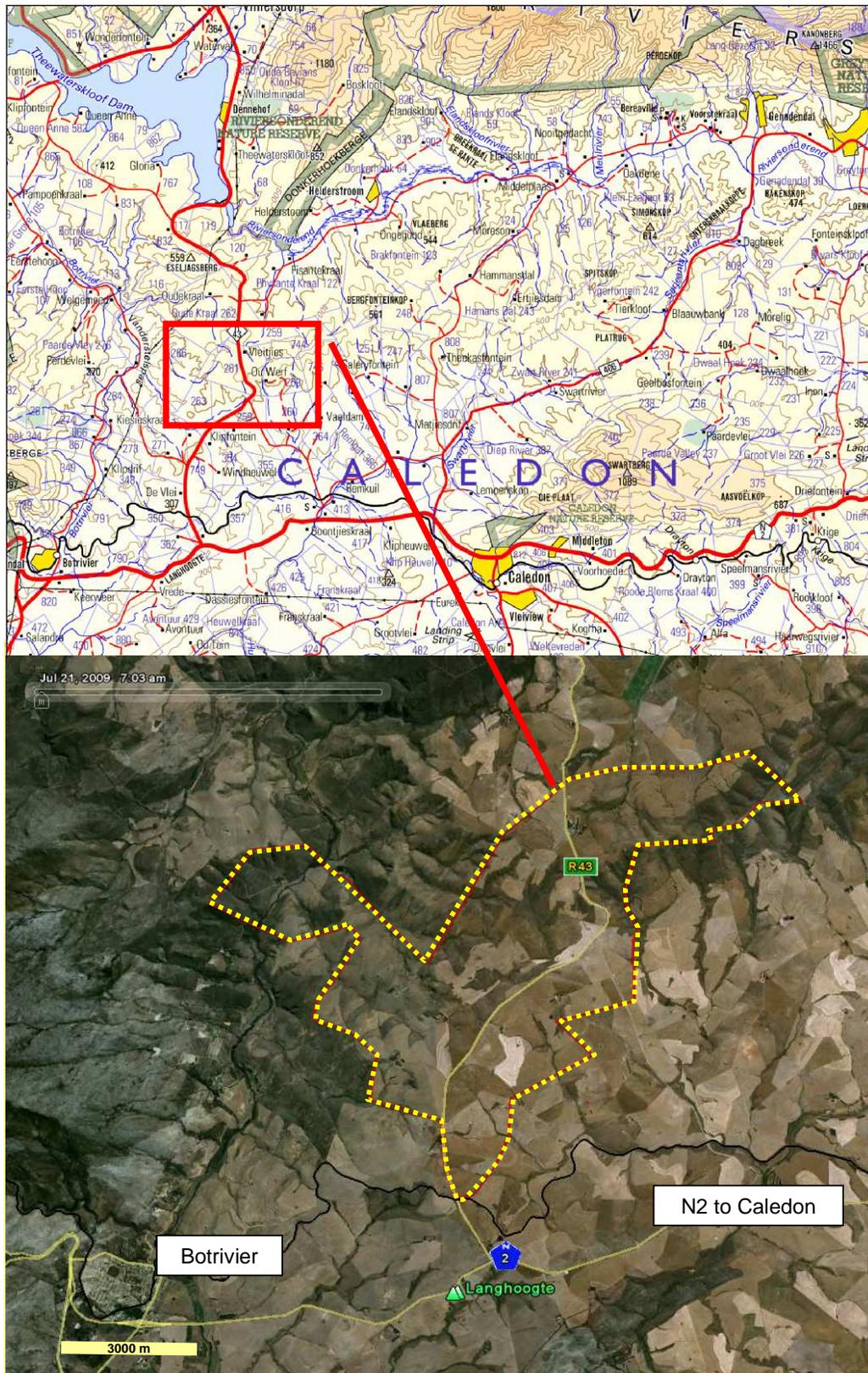


Figure 1 Location of the study area (after 1:250 000 3319-1997 GE and Google Earth

## 1.2 The receiving environment

The study area is situated in the rolling wheat lands of the Overstrand region between Caledon and Botrivier. The site is reached via the R43 turnoff 8 km east of Botrivier (Figure 1). The study area includes portions of 24 farms which incorporates a high ridge which is the focus of the proposed activity. Being elevated above the surrounding rolling hills landscape, this feature is where the highest wind velocities are to be obtained. Initial indications are that much of the site has been subject to generations of agriculture and has low biodiversity in most areas. The steeper parts of the ridge still contain indigenous vegetation. The area has aesthetic values (Figure 2) being situated on the scenic route (R43) to Villiersdorp close to the junction of the R43 and the rural gravel road via the Riviersonderend Valley to Genadendal and Greyton. The entire surrounding area is rural and agricultural with wheat and stock farming being the primary activity taking place. The area is of tourism importance as it is adjacent to one of the scenic routes to Greyton, a popular “getaway” and residential town situated in the foothills of the Riviersonderend Mountains. The historic Moravian mission settlement of Genadendal is a significant National Heritage Site in the area.



**Figure 2** View from the high ridge of the study area

## 2. Methodology for study

This study has been commissioned as a scoping assessment that attempts to predict the possible

range of impacts and identify issues in terms of accumulated knowledge of the area. The source of information that is used for this process is based on the experience of the author of this report who has worked on other wind energy projects, and colleagues. Although there is very little information about the archaeology and built environment of the study area, primary and secondary sources of information with respect to the general area readily available for consultation. A site inspection has been carried out for the purposes of the scoping study. As since the area is relatively unknown in heritage terms, nothing short of a more detailed survey (which will take place during the EIA phase) is deemed adequate.

## 2.1 Restrictions and assumptions

The study area which is substantial in size, has not been subject to a comprehensive survey. This will be conducted during the course of the full EIA. The primary heritage resources that represent the issues that will need to receive detailed attention during the EAI phase are determined to be as follows:

- Paleontology.
- Pre-colonial archaeology (Stone Age as well as possible pre-colonial farming sites).
- Colonial period archaeology.
- The built environment – farm houses, historic roads, places, graveyards, tree lines.
- The cultural landscape – in particular the ability of the landscape to accommodate up to 150 wind turbines in terms of the heritage values and scenic qualities of the area, which in this context are significant.

## 2.2 Legislative context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed. In the case of Environmental Impact Assessments in the Western Cape, the guidelines published by the Provincial Department of Environment Affairs and Tourism are directly based on the provisions of the National Heritage Resources Act (Winter and Baumann 2005).

Loosely defined, *heritage is that which is inherited*. The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- Cultural landscapes
- Buildings and structures (greater than 60 years of age)
- Archaeological sites (greater than 100 years of age)
- Palaeontological sites and specimens
- Shipwrecks and aircraft wrecks
- Graves and grave yards.

Section 38 of the NHRA requires that Heritage Impact Assessments (HIA's) are required for certain kinds of development such as rezoning of land greater than 10 000 sq m in extent or exceeding 3 or more sub-divisions, or for any activity that will alter the character or landscape of a site greater than 5000 sq m. "Standalone HIA's" are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils Section 38 provisions.

### **3. FINDINGS**

#### **3.1 Palaeontology**

The study area is situated in an area characterised by shales of the Bokkeveld group which are potentially fossiliferous in terms of Devonian and Sillurian period fossils (Almond and Pether 2008). The upper layers of the shales are generally quite degraded and the palaeontological potential is variable, however where solid rock is encountered the paleontological potential is high, hence the study area is potentially sensitive. It will therefore be necessary to complete a palaeontological desktop assessment as part of the EIA phase.

##### **3.1.1 Nature of Impacts**

Palaeontological material is destroyed by bulk earthmoving, cutting and mining operations, however Palaeontological resources tend to be extensive (depending on the resource) and are rather more resistant to impact than archaeological material for the simple reason is that there is more of it. Because palaeontological material is often very deeply buried, scientists often rely on human intervention in the land surface to collect data. Aside from natural exposures, open cast mines, quarries and deep road cuttings often present the only opportunities for palaeontologists to examine deep sediments which under normal circumstances they may not have access to. In short, provided that palaeontologists can use the opportunity arising from major construction works to adequately sample and record profiles and exposed material as part of the environmental management process, a potential negative impact can be transformed into a positive opportunity to increase the levels of knowledge about a locality and the species of fauna and flora that were present in the past.

##### **3.1.2 Extent of Impacts**

In the case of the proposed wind energy facility, it is expected that impacts will be quite limited (local) but nevertheless possible. There is a chance that the deep excavations for the tower bases could potentially impact buried fossil bearing shale. Excavation of cable trenches and clearing of access roads is unlikely to impact material that lies buried in the surface soils as this material is weathered and disturbed. Potential impacts caused by a power line, infrastructure such as sub-stations and access roads are similarly un-likely.

#### **3.2 Pre-colonial archaeology**

Almost nothing is known about the frequency or landscape of Late Stone Age (San or Khoekhoen) sites in the study area. What is known is the historically is that the Khoekhoen herders (namely the Hessequa and Chainoquas) (Nienaber 1989 Khoekhoen se Stamname HSRC Pretoria. frequented the area before the advent of colonial period farming. It is also expected that the study area will contain scattered Stone Age archaeological material dating from the Early, Middle and Late Stone Age periods. This has been encountered in several areas throughout the Overberg – the Hemel and Aarde Valley (Hart personal observation), Caledon area (Vos 1996).

##### **3.2.1 Nature of impacts**

The main cause of impacts to archaeological (and palaeontological) sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large scale excavations will damage archaeological sites, construction of roads and laydown areas, injudicious use of off-road vehicles can contribute to high levels of impact. Sites which contain San rock paintings or rock engravings are very sensitive to secondary impacts such as graffiti, wetting and touching. The frequency of this kind

of impact increases when more people are present in the area (i.e. construction teams).

### 3.2.2 Extent of impacts

In the case of the proposed wind energy facility, it is expected that impacts will be quite limited (local) but nevertheless possible. There is a chance that the deep excavations for the tower bases could potentially impact buried archaeological material, similarly excavation of cable trenches and clearing of access roads could impact material that lies buried in the surface sand. Potential impacts caused by a 132 kV power line, two proposed substations and proposed access roads are similarly likely to be limited and local, however these will need to be physically searched and assessed during the EIA phase and the routes adjusted where necessary. Local rock painting sites (if they exist) could suffer secondary impacts.

## 3.3 Colonial period heritage

The general historical context of the study area is significant, although few historic buildings and structures have been identified in the study area to date. It is known that this area has been subject to European settlement since the late 17<sup>th</sup> century (Vos 1996). The fact that most of the farms that make up the study area were established before the mid-18<sup>th</sup> century indicates a high likelihood of structures relating to this time or later being within the study area, or being located within the view shed of the proposed activity. The proximity of the study area to historic towns such as Genadendal, Botrivier will trigger the need for a historic building and place survey within the study area and extending onto neighboring farms.

### 3.3.1 Nature of impacts

Historic structures are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance. The significance of any historic structures will need to be assessed through site inspection and primary and secondary historical research.

### 3.3.2 Extent of Impacts

Direct impacts are not expected, however if the proposed activity stimulates changes in the way that historic structures are utilized, or affects their place and setting negative impacts may result.

## 3.4 Cultural landscape and sense of place

The cultural landscape associated with the study area is quite complex and sensitive due to its location adjacent to key scenic routes to the historic Riviersonderend Valley, Genadendal and Villiersdorp. The heritage qualities of these areas and towns will need to be appraised with a view to determining if the proposed development will impact the sense of history and historical identity of the area.

Wind Energy Facilities are a new concept in South Africa, but are relatively common in Europe and North America. Perusal of international literature indicates that visual impact and changes to *sense of place* or *setting* are among the most contentious issues that the wind energy industry has had to face in terms of finding social acceptability within a given community (Roberta 2007, Clarke 2009). Various nations in the developed world have developed best practice guidelines to deal with the kinds of complex impacts that wind energy facilities can have on the heritage and landscape qualities of an area. In Europe there is a trend towards discouragement of large “wind parks” due to the visual impact they have on landscape. Instead, small clusters of turbines – up to 8 have been found to fit acceptably within Europe’s typically green manicured fields, and from time to time the services of landscape architects have been required to place the turbines in such a way as to achieve an

aesthetically pleasing result. South African landscapes are very different and will have different capacities in terms of their “aesthetic absorption” ability. As yet South Africa does not have well developed guidelines or the benefit of experience within our own landscapes, which is an issue that needs to be addressed and work-shopped at the level of the South African Heritage Resources Agency.

The proliferation of wind energy facilities in South Africa in the absence of heritage guidelines or policy is a cause for concern in terms of accumulative impacts. Wind energy facilities which require vast amounts of landscape threaten significant impacts in terms of potential loss of iconic vistas, and landscape character change, especially in the Cape Province where the identity of the region is strongly linked to its spectacular landscape character.

#### 3.4.1 Nature of impacts

Cultural landscapes are highly sensitive to accumulative impacts and large scale development activities that change the character and public memory of a place. The construction of a large facility is likely to result in profound changes to the overall sense of place of a locality, if not a region. The proposed activity is essentially a visual intrusion that is very difficult to measure due to the fact that there is little reference material on which the sense of change can be gauged in a local context.

#### 3.4.2 Extent of impacts

Massed wind turbines, are without doubt conspicuous structures which will affect the atmosphere of the “place”. While this impact may be considered local in terms of physical extent, there may be wider implications in terms of the change in “identity” of the area and the cumulative effect this could have on future tourism potential. In terms of this study it is anticipated that negative landscape impacts and will potentially affect the experience of driving to Greyton and Genadendal via the Rivieronderend valley and impact the scenic drive northwards to Villiersdorp. This means that the potential for alteration to the cultural landscape and sense of place is considered an issue that will need further attention in the EIA phase. Very close integration of the heritage study and the visual impact assessment will be required.

### **4. Future work in the EIA phase**

#### **4.1 Paleontological material**

It will be necessary to undertake palaeontological desktop assessment during the EIA phase. During construction, especially the excavation of bases for the turbines, periodic monitoring of the excavations is likely to be required.

#### **4.2 Archaeological heritage**

It is expected that much the surface archaeological heritage (pre-colonial and colonial) will be controllable through avoidance of sensitive areas. Micro-adjustment of turbine footings, moderate deviations in service trenches, road alignments or power line towers are expected to be all that will be required in terms of mitigation of open pre-colonial/colonial sites. If for any reason mitigation by avoidance is not feasible, the usual process is to record and sample the archaeological site before its destruction is permitted.

#### **4.3 Un-identified archaeological material, fossils and fossil bone**

There is always a chance that archaeological material may be exposed during bulk excavation for services and foundations. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by SAHRA. In the event of

anything unusual being encountered, the SAHRA archaeology unit must be consulted immediately so that mitigation action can be determined and be implemented if necessary (find-stop scenario). Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

#### **4.4 Built Environment**

It is not expected that the built environment will be directly impacted by the proposal unless it becomes necessary to demolish structures that are greater than 60 years of age. It is possible that farm houses may change use as a result of the activity, which case application of the requirements of the NHRA is appropriate, the responsibility for which falls on the landowner. It is anticipated in most instances, it will be possible to adjust turbine locations to avoid impacts.

#### **4.5 Cultural landscape and sense of place**

This is perhaps the most difficult heritage impact to address. There is no doubt that the wind turbines will affect the landscape qualities of the site, however the degree of impact will be very closely related to the visual impacts of the proposed activity (the visual impact will be separately addressed). The locating of infrastructure close to historical farms and settlements may result in impacts to the quality of the place and detract from sense of history and/or wilderness. From this perspective the layout of the facility will need to respond to the findings of the heritage impact component of the EIR along with close input from the visual specialist.

### **5. CONCLUSION**

Indications are that in terms of archaeological heritage and built environment the proposed activity is viable, impacts are expected to be limited and controllable.

In terms of the natural cultural landscape qualities of the site, impacts are expected which are potentially severe, especially since the proposed activity is situated in a prominent and scenic area, in a region valued for its historical rural character (Baumann, Winter and Cliff in prep). The degree and nature of the impact is going to depend on how the wind turbines are arranged on the landscape, and the ability of the topography to absorb their presence which is an issue which will require close attention during the course of the EIA.

In terms of the information available at this time, the landscape impacts of the proposal area a serious concern and may not receive support from Heritage Western Cape.

#### **5.1 Further work**

The EIA phase study needs to fulfill the requirements of heritage impact assessment as defined in section 38 of the NHRA. This means that the assessment has to cover the full range of potential cultural heritage as defined by the term "culture" contained in the National Heritage Resources Act 25 of 1999.

The proposed study area needs to be subject to a detailed survey by an archaeologist who will need to walk a pattern of transects over the site recording details and locations of any heritage material found. The significance of each find will need to be assessed along with the impacts of the proposed activity. Mitigation measures will need to be identified.

Proposed routes of linear infrastructure (access roads, underground services, power lines) will need to be ground-proofed to establish the impacts of the proposed activity and determine where mitigation (if any) will be required.

The colonial period historical significance of the site will need to be established through archival and deeds surveys and the assessment and grading of the built environment by an (accredited professional) in the study area and within a radius of 2km from the boundaries of the study area. Lost historical significance (if any) will need to be identified and the proposed action assessed to determine if it presents any impacts to the historical significance of the "place". In terms of cultural landscape, more research is required into determining what would be best practice on terms of South African Landscapes, and it is the intention to gather information in this regard to inform the future EIA process. Close co-operation with the VIA specialist will be required.

Follow up heritage work such as monitoring of excavations by a paleontologist or archaeological sampling is likely to be a requirement of the Environmental Management Plan.

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